

AMENDMENTS TO THE CLAIMS

1 (Currently Amended) Apparatus for inputting at least alpha-numeric information into a computer comprising:

a projector, projecting an image of at least part of a keyboard onto an inert surface;
at least one two dimensional sensor comprising at least one infrared illuminator,
sensing user indicator interaction with specific locations on said image of at least part of a keyboard; and

at least alpha-numeric information generation circuitry employing an output from said at least one sensor for providing an at least alpha-numeric output.

2. (Original) Apparatus according to claim 1 and also comprising a wireless communicator operative to provide said at least alpha-numeric output in a wireless manner to a receiver.

3. (Original) Apparatus according to claim 2 and wherein said wireless communicator comprises a cellular telephone.

4. (Original) Apparatus according to claim 3 and wherein said cellular telephone includes a housing, in which housing are mounted said projector, said at least one sensor and said at least alpha-numeric information generation circuitry.

5. (Currently Amended) Apparatus according to claim 1 and also comprising ~~comprises~~ a personal digital assistant.

6 (Currently Amended) Apparatus according to claim ~~25~~ and wherein said personal digital assistant includes a housing, in which housing are mounted said projector, said at least one sensor and said at least alpha-numeric information generation circuitry.

7. (Currently Amended) Apparatus according to claim 1 and wherein said at least

one infrared illuminator is operative to direct infrared radiation over said image of at least part of a keyboard and said at least one sensor also comprises ~~at least one infra-red illuminator, directing infra-red radiation over said image of at least part of a keyboard onto an inert surface and~~ at least one ~~infra-red~~ infrared sensor for sensing ~~infra-red~~ infrared light scattered from at least one user indicator.

8. (Currently Amended) Apparatus according to claim 2 and wherein said at least one infrared illuminator is operative to direct infrared radiation over said image of at least part of a keyboard and said at least one sensor also comprises ~~at least one infra-red illuminator, directing infra-red radiation over said image of at least part of a keyboard onto an inert surface and~~ at least one ~~infra-red~~ infrared sensor for sensing ~~infra-red~~ infrared light scattered from at least one user indicator.

9. (Original) Apparatus according to claim 3 and wherein said at least one sensor comprises at least one visible light illuminator, directing visible radiation over said image of at least part of a keyboard onto an inert surface and at least one visible radiation sensor for sensing visible light scattered from at least one user indicator.

10. (Original) Apparatus according to claim 4 and wherein said at least one sensor comprises at least one visible light illuminator, directing visible radiation over said image of at least part of a keyboard onto an inert surface and at least one visible radiation sensor for sensing visible light reflected from at least one user indicator.

11. (Original) Apparatus according to claim 1 and wherein said user indicator is a user finger.

12. (Original) Apparatus according to claim 1 and wherein said user indicator is a user held stylus.

13. (Original) Apparatus according to claim 1 and wherein said projector comprises a point light source illuminating a mask defining said image of at least part of a keyboard.

14. (Original) Apparatus according to claim 13 and also comprising a mirror directing light passing through said mask onto said inert surface.

15. (Currently Amended) Apparatus according to claim 13 and also comprising at least one lens directly receiving light from said point source through said mask.

16. (Original) Apparatus according to claim 13 and wherein said point light source comprises a diode laser.

17. (Original) Apparatus according to claim 13 and wherein said mask is formed to define a distorted representation of said image of said at least part of a keyboard in order to compensate for distortions in said projector.

18. (Original) Apparatus according to claim 13 and wherein said mask is a dynamically changeable mask.

19. (Currently Amended) Apparatus according to claim 71 and wherein said ~~infra-red~~ infrared illuminator comprises a cylindrical reflecting element receiving light from a point source and producing a generally flat, generally radially-directed light distribution.

20. (Currently Amended) Apparatus according to claim 8 and wherein said ~~infra-red~~ infrared illuminator comprises a cylindrical reflecting element receiving light from a point source and producing a generally flat, generally radially-directed light distribution.

21. (Currently Amended) Apparatus according to claim 9 and wherein said visible

~~radiation~~ light illuminator comprises a cylindrical reflecting element receiving light from a point source and producing a generally flat, generally radially-directed light distribution.

22. (Currently Amended) Apparatus according to claim 10 and wherein said visible ~~radiation~~ light illuminator comprises a cylindrical reflecting element receiving light from a point source and producing a generally flat, generally radially-directed light distribution.

23. (Original) Apparatus according to claim 1 and wherein said at least one sensor comprises an array of discrete sensing elements and at least one lens operative to image a region overlying each of a plurality of keyboard locations onto a corresponding at least one of said array of discrete sensing elements.

24. (Original) Apparatus according to claim 1 and wherein said at least one sensor comprises an a position sensitive detector and at least one lens operative to image a region overlying each of a plurality of keyboard locations onto a corresponding region on said position sensing detector.

25. (Currently Amended) Apparatus according to claim 7 and wherein said at least one ~~infra-red~~ infrared illuminator is operative to direct ~~infra-red~~ infrared radiation at a plurality of levels over said image of at least part of a keyboard and said at least one ~~infra-red~~ infrared sensor is operative to sense ~~infra-red~~ infrared light scattered from at least one user indicator at a plurality of locations therealong.

26. (Currently Amended) Apparatus according to claim 8 and wherein said at least one ~~infra-red~~ infrared illuminator is operative to direct ~~infra-red~~ infrared radiation at a plurality of levels over said image of at least part of a keyboard and said at least one ~~infra-red~~ infrared sensor is operative to sense ~~infra-red~~ infrared light reflected from at least one user indicator at a plurality of locations therealong.

27. (Currently Amended) Apparatus according to claim 9 and wherein said at least one visible ~~radiation~~ light illuminator is operative to direct visible radiation at a plurality of levels over said image of at least part of a keyboard and said at least one visible radiation sensor is operative to sense visible radiation light scattered from at least one user indicator at a plurality of locations therealong.

28. (Currently Amended) Apparatus according to claim 10 and wherein said at least one visible ~~radiation~~ light illuminator is operative to direct visible radiation at a plurality of levels over said image of at least part of a keyboard and said at least one visible radiation sensor is operative to sense visible radiation light reflected from at least one user indicator at a plurality of locations therealong.

29. (Original) Apparatus according to claim 1 and wherein said projector comprises a diffractive optical element, which when illuminated produces said image of at least part of a keyboard onto said inert surface.

30. (Original) Apparatus according to claim 1 and wherein said projector comprises a spatial light modulator, which when illuminated produces said image of at least part of a keyboard onto said inert surface.

31. (Original) Apparatus according to claim 30 and wherein said spatial light modulator comprises a dynamic spatial light modulator which is responsive to an electrical input for producing a dynamic image onto said inert surface.

32. (Currently Amended) Apparatus according to claim 1 and wherein:
said projector ~~protects~~ projects an image of at least part of a keyboard and of mouse functionality onto said inert surface; and
said at least one sensor senses user indicator interaction with specific locations on said image of said mouse functionality.

33. (Currently Amended) Apparatus for inputting at least cursor-control information into a computer comprising:

a projector, projecting an image of at least part of mouse functionality onto an inert surface;

~~at least one~~ a single two dimensional sensor comprising at least one infrared illuminator, sensing user indicator interaction with specific locations on said image of at least said mouse functionality; and

at least cursor control information generation circuitry employing an output from said ~~at least one~~ single sensor for providing an at least a cursor control output.

34. (Currently Amended) A wireless system for web browsing comprising:

a wireless communicator providing web browsing functionality; and

at least one projector mounted on said wireless communicator and projecting an image of a display onto a surface.

35. (Cancelled)

36. (Currently Amended) A wireless system for web browsing comprising:

a wireless communicator providing web browsing functionality;

at least one projector mounted on said wireless communicator and projecting an image of at least part of a keyboard onto a surface;

at least one two dimensional sensor comprising at least one infrared illuminator, sensing user indicator interaction with specific locations on said image of at least part of a keyboard; and

at least alpha-numeric information generation circuitry employing an output from said at least one sensor for providing an at least alpha-numeric output.

37. (Original) A wireless system for web browsing according to claim 36 and wherein said projector is also operative for projecting an image of a display onto a surface, whereby a user may readily view images produced during web browsing.

38. (Currently Amended) A wireless system for web browsing according to claim 37 and also comprising:

at least one two dimensional sensor, sensing user indicator interaction with specific locations on said image of said display; and

web browsing input circuitry employing an output from said at least one sensor for providing an at least one web browsing output based on user implemented actuation of locations on said image of said display corresponding to web links.

39. (Cancelled)

40. (Cancelled)

41. (Currently Amended) A wireless system for e-mail communication comprising:
a wireless communicator providing e-mail communication functionality;
at least one projector mounted on said wireless communicator and projecting an image of at least part of a keyboard onto a surface;

at least one two dimensional sensor comprising at least one infrared illuminator, sensing user indicator interaction with specific locations on said image of at least part of a keyboard; and

at least alpha-numeric information generation circuitry employing an output from said at least one sensor for providing an at least alpha-numeric output.

42. (Currently Amended) A wireless system for e-mail communication according to claim 41 and wherein said projector is also operative for projecting an image of a display onto a surface, whereby a user may readily view messages during e-mail communication.

43. (Currently Amended) A wireless system for e-mail communication according to claim 42 and also comprising:

at least one sensor, sensing user indicator interaction with specific locations on said image of said display; and

e-mail communication input circuitry employing an output from said at least one sensor for providing an at least one e-mail communication output based on user implement actuation of locations on said image of said display.

44. (Cancelled)

45. (Cancelled)

46. (Currently Amended) A wireless system for mobile commerce communication comprising:

a wireless communicator providing mobile commerce communication functionality;

at least one projector mounted on said wireless communicator and projecting an image of at least part of a keyboard onto a surface;

at least one two dimensional sensor comprising at least one infrared illuminator, sensing user indicator interaction with specific locations on said image of at least part of a keyboard; and

at least alpha-numeric information generation circuitry employing an output from said at least one sensor for providing at least an mobile commerce communication output.

47. (Original) A wireless system for mobile commerce communication according to claim 46 and wherein said projector is also operative for projecting an image of a display onto a surface, whereby a user may readily view images produced during mobile commerce communication.

48. (Original) A wireless system for mobile commerce communication according to claim 47 and also comprising:

at least one sensor, sensing user indicator interaction with specific locations on said image of said display; and

mobile commerce communication input circuitry employing an output from said at least one sensor for providing an at least one mobile commerce communication output based on user implement actuation of locations on said image of said display corresponding to web links.

49. (Currently Amended) A method for inputting at least alpha-numeric information into a computer comprising:

projecting an image of at least part of a keyboard onto an inert surface;

employing at least one two dimensional sensor comprising at least one infrared illuminator for sensing user indicator interaction with specific locations on said image of at least part of a keyboard; and

employing an output indicating sensed user ~~indication~~ indicator interaction for providing an at least alpha-numeric output.

50. (Original) A method according to claim 49 and also comprising providing said at least alpha-numeric output in a wireless manner to a receiver.

51. (Currently Amended) A method according to claim 49 and wherein said sensing comprises directing ~~infra-red~~ infrared radiation over said image of at least part of a keyboard on an inert surface and sensing ~~infra-red~~ infrared light scattered from at least one user indicator.

52. (Original) A method according to claim 49 and wherein said sensing comprises directing visible radiation over said image of at least part of a keyboard on an inert surface and sensing visible light scattered from at least one user indicator.

53. (Original) A method according to claim 49 and wherein said user indicator is a user finger.

54. (Original) A method according to claim 49 and wherein said user indicator is a user held stylus.

55. (Original) A method according to claim 51 and wherein said directing comprises reflecting light from a point source and producing a generally flat, generally radially-directed light distribution.

56. (Original) A method according to claim 52 and wherein said directing comprises reflecting light from a point source and producing a generally flat, generally radially-directed light distribution.

57. (Original) A method according to claim 49 and wherein said sensing comprises employing an array of discrete sensing elements and imaging a region overlying each of a plurality of keyboard locations onto a corresponding at least one of said array of discrete sensing elements.

58. (Original) A method according to claim 49 and wherein said sensing comprises position sensitive detecting and imaging of a region overlying each of a plurality of keyboard locations onto a corresponding region on said position sensing detector.

59. (Currently Amended) A method according to claim 51 and wherein said directing includes directing ~~infra-red~~ infrared radiation at a plurality of levels over said image of at least part of a keyboard and said ~~infra-red~~ sensing includes sensing ~~infra-red~~ light scattered from at least one user indicator at a plurality of locations therealong.

60. (Original) A method according to claim 52 and wherein said directing includes directing visible radiation at a plurality of levels over said image of at least part of a keyboard and said visible sensing includes sensing visible light scattered from at least one user indicator at a plurality of locations therealong.

61. (Original) A method according to claim 49 and wherein said projecting comprises illuminating a diffractive optical element to produce said image of at least part of a keyboard onto said inert surface.

62. (Original) A method according to claim 49 and wherein said projecting comprises illuminating a spatial light modulator to produce said image of at least part of a keyboard onto said inert surface.

63. (Original) A method according to claim 62 and wherein said projecting comprises illuminating a dynamic spatial light modulator which is responsive to an electrical input for producing a dynamic image onto said inert surface.

64. (Cancelled)

65. (Cancelled)

66. (Currently Amended) A method for wireless web browsing comprising:
providing web browsing functionality;
projecting an image of at least part of a keyboard onto a surface;
employing at least one two dimensional sensor comprising at least one infrared illuminator for sensing user indicator interaction with specific locations on said image of at least part of a keyboard; and
generating an output useful in said web browsing functionality from said sensing for providing an at least alpha-numeric output.

67. (Original) A method for wireless web browsing according to claim 66 and wherein said projecting comprises projecting an image of a display onto a surface, whereby a user may readily view images produced during web browsing.

68. (Currently Amended) A method for wireless web browsing according to claim 67 and also comprising:
sensing user indicator interaction with specific locations on said image of said display; and

employing an output from said sensing for providing an at least one web browsing output based on user implemented actuation of locations on said image of said display corresponding to web links.

69. (Cancelled)

70. (Cancelled)

71. (Currently Amended) A method for wireless e-mail communication comprising:
providing e-mail communication functionality;
projecting an image of at least part of a keyboard onto a surface;
employing at least one two dimensional sensor comprising at least one infrared illuminator for sensing user indicator interaction with specific locations on said image of at least part of a keyboard; and
generating an output from said at least one sensor for providing an at least alphanumeric output useful in said communication functionality.

72. (Currently Amended) A method for wireless e-mail communication according to claim 71 and wherein said projection comprises projecting an image of a display onto a surface, whereby a user may readily view messages during e-mail communication.

73. (Currently Amended) A method for wireless e-mail communication according to claim 72 and also comprising:
sensing user indicator interaction with specific locations on said image of said display; and
employing an output from said sensing for providing an at least one e-mail communication output based on user implemented actuation of locations on said image of said display.

74. (Cancelled)

75. (Cancelled)

76. (Currently Amended) A method for wireless mobile commerce communication comprising:

providing mobile commerce communication functionality;

projecting an image of at least part of a keyboard onto a surface;

employing at least one two dimensional sensor comprising at least one infrared illuminator for sensing user indicator interaction with specific locations on said image of at least part of a keyboard; and

generating an output from said at least one sensor for providing at least a mobile commerce communication output.

77. (Original) A method for wireless mobile commerce communication according to claim 76 and wherein said projection comprises projecting an image of a display onto a surface, whereby a user may readily view images produced during mobile commerce communication.

78. (Currently Amended) A method for wireless mobile commerce communication according to claim 77 and also comprising:

sensing user indicator interaction with specific locations on said image of said display; and

employing an output from said sensing for providing an at least one mobile commerce communication output based on user implemented actuation of locations on said image of said display corresponding to web links.

79. (Original) A method according to claim 49 and wherein:

said projection projects an image of at least part of a keyboard and of mouse functionality onto said inert surface; and

said sensing senses user indicator interaction with specific locations on said image of said mouse functionality.

80. (Currently Amended) A method for inputting at least cursor-control information into a computer comprising:

projecting an image of at least part of mouse functionality onto an inert surface;

employing a single two dimensional sensor comprising at least one infrared illuminator for sensing user indicator interaction with specific locations on said image of at least said mouse functionality; and

generating an output from said ~~at least one~~ single sensor for providing an at least a cursor control output.